**Engineering Portfolio**

What is Engineering?

1. What is engineering as a career and profession?
2. Review the early engineering disciplines and discuss their evolution.
3. Describe the engineering profession and engineering ethics, including professional practice and licensure.
4. What are the types of Engineering Disciplines?
5. What types of engineering careers are you interested in pursuing? What contact information have you obtained?
6. Articulate the rate of innovation though Moore’s law

Engineering design process.

1. Identify and perform brainstorming strategies
2. Define the term engineering design.
3. Describe and explain the features and purpose of a design.
4. What are the steps of the engineering design process?
5. Explain the engineering analysis and design processes
6. Describe what pressures are prevalent in engineering design (universal design).
7. Identify objects of poor design, evaluate the problems, and redesign them
8. How can failure be an effective tool to inform and inspire new ideas? (Explain the viewpoint that failure is a byproduct of pushing the envelope.)
9. Develop an idea, and break it into steps and a timeframe for completion.
10. Contrast quality and efficiency as significant factors in engineering
11. Build the project, test, redesign and re-test the project.
12. Describe how you used the ten step design process in a project.

Engineering Tools.

1. What is the purpose of sketching/developing blueprints?
2. Use technical writing skills to create two engineering documents.
3. Develop rating scales and specific criteria for a specified product (Analyze a situation, identifying the constraints.)
4. Develop a risk assessment for both production and long-term environmental impacts.
5. Design and build an object based on the engineering design process?
6. Defend a modified system in a presentation to peers
7. Can you represent solutions to a design process in multiple ways?
8. Can you choose the correct tool for the task?
9. Be able to communicate and present your findings indicating your use of the failure mode, and describe your steps used to develop successful strategies.
10. Demonstrate computer literacy

Engineering analysis problem solving.

1. Define the terms analytic and creative problem solving
2. Discuss product specifications and their role in engineering
3. Develop a simple design with limited parameters
4. Determine the success of a redesign by evaluating its effectiveness using measurements and graphs to communicate your findings. (catapult, football helmet, crash test)
5. Compile simple experiment data, comparing and contrasting results from peers
6. Analyze data collected during laboratory exercises designed to require different engineering disciplines

Engineers and the Real World.

1. What is the impact of engineering and the contributions of engineers in the real world?
2. Develop a solution using the engineering design process.
3. Evaluate an object, design and develop new ideas, construct a model (computer?), and if possible, build a prototype.
4. Design a steel truss bridge (bridge building) to carry a two lane highway over a river
5. Design an object which can transfer one form of energy to another? (Build an electromagnet into a device that transforms one form of energy into another- Wind Generator?)?
6. Test a device, re-evaluate, and correct the design.

Project management and Team working skills

1. Articulate the advantages of teamwork and describe characteristics of great teams
2. Classify leader attributes and leadership styles
3. Examine a system, describe its parts and modify it based on input from a team
4. Develop directions for a simple design to be assembled by peers.
5. Choose an object to redesign and work effectively in a group, problem solving to develop new designs. (Teamwork) (Design challenge)
6. As part of a team, design a simple engineering device, write a design report, and present the design.